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IBM Corporation
IP Law Department
11400 Burnet Road
Austin, TX 78758

EXAMINER

SCHELL, JOSEPH O

ART UNIT	PAPER NUMBER
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2114

DATE MAILED: 05/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/660,010

Applicant(s)

BUXTON ET AL.

Examiner

Joseph Schell

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 September 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Detailed Action

Claims 1-13 have been examined.

Claims 1-13 have been rejected.

Claim Objections

1. Claim 2, line 1 should read "including the **step** of" as only a single step is being added by the claim.

2. The claims make use of various unusual meanings for the word "which" that the examiner would like to confirm using the changes below or otherwise have explained.

Claim 2, line 4 should read "data, **wherein said** subset corresponds..."

Claim 4 lines 4 and 6 should read "restore operations **when** the corresponding..."

Claim 5 line 3 should read "restore operations, wherein **a pair**" or "wherein **each pair**" and line 5 should read "**said** pair of updates..."

Claim 12 line 9 should read "secondary data storage **wherein said** secondary copy is sufficient..."

Claim 13 line 6 should read "secondary data storage **wherein said** secondary copy is sufficient..."

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 3 and 5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Specifically, regarding claim 3, the claim expresses a limitation and then uses "thereby" to rephrase the limitation in broader terms excluding the specifics of deleting from cache and that the deleted information is neither committed nor in-doubt.

5. Specifically, regarding claim 5, the claim expresses a limitation and then uses "thereby" to rephrase the limitation in broader terms excluding the specifics of the pairs of updates being the addition of a data item and retrieval of the same data item.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 4, 6, 8, 10 and 12-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Kettley (US Patent 6,754,842).

7. As per claim 1, Kettley ('842) discloses a method for recovery from failures affecting a primary copy of a data repository (column 5 lines 60-64, the queue of messages), for use in a data processing system in which updates applied to the data repository during normal forward processing are applied within transactional units of work (column 6 lines 7-11), the method including the steps of:

storing a secondary copy of data representing data items held within the data repository and updates applied to the data repository within said units of work (column 6 lines 57-59, logs of sub-units of work are kept);

in response to a failure affecting a primary copy of the data repository, identifying from said secondary copy a set of operations required for restoring said data items and applied updates to a primary copy of the data repository (column 5 lines 4-12);

determining the state, at the time of the failure, of each unit of work corresponding to one or more operations of the identified set of restore operations (column 6 lines 25-27 and column 7 lines 55-59); and

performing restore operations of said identified set for which said performance is consistent with the determined state of the corresponding unit of work (column 7 lines 39-42), and discarding restore operations of said identified set for which performance is inconsistent with the determined state of the corresponding unit of work (column 9 lines 24-29).

8. As per claim 4, Kettley ('842) discloses a method according to claim 1, wherein the step of performing restore operations includes the steps of:

performing restore operations for which the corresponding unit of work is determined to be committed (column 8 lines 38-43); and

performing restore operations for which the corresponding unit of work is determined to be in-doubt, and marking the data item to indicate that the unit of work is in-doubt (column 8 lines 3-8).

9. As per claim 6, Kettley ('842) discloses a method according to claim 1, wherein storing the secondary copy comprises storing a backup copy of the data repository (column 6 lines 48-51) and storing log records describing updates to the primary copy performed since the backup copy was stored (column 6 line 65 through column 7 line 2); and wherein the step of identifying said set of operations comprises replaying the log

records to identify operations performed on the primary copy of the data repository (column 8 lines 40-41, status rebuild of the primary database is done using a list of units of work to perform).

10. As per claim 8, Kettley ('842) discloses a method according to claim 1, wherein the data repository is a message repository and the step of restoring data to the primary copy of the data repository comprises performing message add, update and delete operations on the message repository (column 6 lines 7-11, during recovery units of work are added to a list. Column 9 lines 1-3, these units of work are the same types of units of work as used for regular operation).

11. As per claim 10, Kettley ('842) discloses a data communication system including:
data storage for storing a primary copy of a data repository (column 5 lines 60-64, the queue of messages);

secondary data storage for storing a secondary copy of data representing the data repository which secondary data is sufficient to recover the primary copy of the data repository and a data held thereon (see abstract, the recovery log);

a recovery component for controlling the operation of the data communication system to recover from a failure affecting the primary copy of the data repository (column 2 lines 56-59, the data processing system contains the primary copy. The system is controlled by the Queue Manager (column 6 lines 19-24)), wherein the

recovery component is operable to control the data communication system to perform the steps of:

in response to a failure affecting a primary copy of the data repository, identifying from said secondary copy a set of operations required for restoring said data items and applied updates to a primary copy of the data repository (column 5 lines 4-12);

determining the state, at the time of the failure, of each unit of work corresponding to one or more operations of the identified set of restore operations (column 6 lines 25-26 and column 7 lines 55-59); and

performing restore operations of said identified set for which said performance is consistent with the determined state of the corresponding unit of work (column 7 lines 39-42), and discarding restore operations of said identified set for which performance is inconsistent with the determined state of the corresponding unit of work (column 9 lines 24-29).

12. As per claim 12, Kettley ('842) discloses a computer program product comprising program code recorded on a recording medium for controlling the operation of a data processing apparatus on which the program code executes to perform a method for recovering a data repository from a failure affecting a primary copy of the data repository (column 5 lines 60-64, the queue of messages), for use with a data processing apparatus having a secondary data storage and having a component for maintaining a secondary copy of a data in the secondary data storage which secondary copy is sufficient to recover the primary copy of the data repository and data items held

thereon (column 6 lines 45-51 and column 6 line 65 through column 7 line 2), and wherein updates applied to the data repository are applied within transactional units of work, the method including the steps of:

in response to a failure affecting a primary copy of the data repository, identifying from said secondary copy a set of operations required for restoring said data items and applied updates to a primary copy of the data repository (column 8 lines 40-41, status rebuild of the primary database is done using lists of units of work);

determining the state, at the time of the failure, of each unit of work corresponding to one or more operations of the identified set of restore operations (column 6 lines 25-27 and column 7 lines 55-59); and

performing restore operations of said identified set for which said performance is consistent with the determined state of the corresponding unit of work (column 7 lines 39-42), and discarding restore operations of said identified set for which performance is inconsistent with the determined state of the corresponding unit of work (column 9 lines 24-29).

13. As per claim 13, Kettley ('842) discloses a recovery component for recovering a data repository from a failure affecting a primary copy of the data repository (column 6 lines 19-24, the queue manager controls recovery), for use with a data processing system having primary and secondary data storage and having a component for maintaining a secondary copy of data in the secondary data storage for which secondary copy is sufficient to recover the primary copy of the data repository and data

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items held thereon (column 6 lines 57-59, logs of sub-units of work are kept), wherein updates applied to the data repository are applied within transactional units of work (column 6 lines 7-11), the recovery component being adapted to perform a method including the steps of:

in response to a failure affecting a primary copy of the data repository, identifying from said secondary copy a set of operations required for restoring said data items and applied updates to a primary copy of the data repository (column 5 lines 4-12);

determining the state, at the time of the failure, of each unit of work corresponding to one or more operations of the identified set of restore operations (column 6 lines 25-27 and column 7 lines 55-59); and

performing restore operations of said identified set for which said performance is consistent with the determined state of the corresponding unit of work (column 7 lines 39-42), and discarding restore operations of said identified set for which performance is inconsistent with the determined state of the corresponding unit of work (column 9 lines 24-29).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 2, 3, 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kettley ('842) in view of Koseki (US Patent 6,732,124).

15. As per claim 2, Kettley ('842) discloses the method according to claim 1. Kettley ('842) does not does not explicitly disclose the method including the steps of

saving to a cache a subset of said secondary copy of data, which subset corresponds to the identified set of operations required for restoring said data items and applied updates;

and wherein, subsequent to the step of determining the state of each unit of work, the step of performing restore operations comprises applying restore operations from said cache.

Koseki ('124) teaches a system that performs operation logging with file system recovery when consistency is lost incorporating a data cache (see abstract). Within the system taught by Koseki ('124) the cache stores a subset of recovery operations stored within a backup log (column 15 32-36).

At the time of invention it would have been obvious to a person of ordinary skill in the art to modify the system disclosed by Kettley ('842) such that a cache is included for backup logs as disclosed by Koseki ('124). This modification would have been obvious because reading and writing to a cache is faster (Koseki ('124) column 1 lines 47-52).

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16. As per claim 3, Kettley ('842) in view of Koseki ('124) discloses a method according to claim 2, including the step of deleting from the cache the restore operations for which the corresponding unit of work is determined to be neither committed nor in-doubt, thereby to discard said restore operations for which performance is inconsistent with the determined state of the corresponding unit of work, when performing restore operations (Koseki ('124) teaches the use of a buffer cache to reduce IO operations to the log storage (column 22 lines 52-54), this buffer is used to allow only the logging of operations that have been committed (column 10 lines 10-16). As disclosed by Kettley ('842), in-doubt transactions should also be logged and thus saved by the buffer (column 8 lines 3-7)).

17. As per claim 5, Kettley ('842) in view of Koseki ('124) discloses a method according to claim 2, including the step of deleting from the cache any pairs of updates within the set of restore operations, which pair of updates correspond to addition of a data item and retrieval of the same data item and which pair of updates was completed prior to the failure, thereby to discard said pairs of updates when performing restore operations (column 4 lines 43-46, a cache is a temporary memory and after its contents have been backed up by being read into storage, the cache may be freed up for other data).

18. As per claim 7, Kettley ('842) discloses a method according to claim 1, wherein storing the secondary data copy includes maintaining log records that describe

operations performed on data items within the data repository (column 6 lines 19-25), and wherein the step of restoring data to the primary copy of the data repository includes the steps of:

Replaying the log records of operations performed on data items within the data repository (column 7 lines 39-42, during recovery, logged operations are re-performed), storing log records relating to operations performed on data items within the data repository within an original unit of work (column 6 lines 46-51), determining from the stored log records the state of the original units of work at the time of the failure (column 7 lines 55-59), and determining, for said operations having stored log records, which operations to perform within the recovery unit of work based on the determined state of the original units of work (column 7 lines 55-59 and column 6 lines 19-24).

Kettley ('842) does not explicitly disclose the system wherein the stored log records are stored within a cache.

Koseki ('124) teaches a system that performs operation logging with file system recovery when consistency is lost incorporating a data cache (see abstract). Within the system taught by Koseki ('124) the cache stores a subset of recovery operations stored within a backup log (column 15 32-36).

At the time of invention it would have been obvious to a person of ordinary skill in the art to include within the system disclosed by Kettley ('842) a cache memory for the log. This modification would have been obvious because cached data is accessed faster (Koseki ('124) column 1 lines 48-51).

19. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kettley ('842) in view of Koseki ('124) and Demers (US Patent 5,577,240).

Kettley ('842) discloses a method according to claim 8, wherein maintaining the secondary data copy includes storing log records to describe updates to the primary copy (column 6 lines 46-51), and wherein the step of restoring data to the primary copy of the repository includes the steps of storing log records relating to entry add, update and delete operations (column 6 lines 7-11, during recovery units of work are added to a list. Column 9 lines 1-3, these units of work are the same types of units of work as used for regular operation) performed under syncpoint control (column 7 lines 16-18) within an original unit of work (column 1 lines 36-40), determining from the log records that state of the original unit of work at the time of the failure (column 7 lines 55-59), and determining the operations to perform within the recovery unit of work based on the determined state of the original unit of work as follows:

if the original unit of work is committed, performing the relevant message add, update and delete operations (column 8 lines 38-43); and

if the original unit of work is in-doubt, performing the relevant message add, update and delete operations but marking the operations in-doubt (column 8 lines 3-8); and

if the original unit of work is neither committed nor in-doubt, discarding the cached operations (column 9 lines 24-29).

Kettley ('842) does not explicitly disclose the system within a messaging communication system wherein the entries are messages and wherein the database includes a cache.

Koseki ('124) teaches a system that performs operation logging with file system recovery when consistency is lost incorporating a data cache (see abstract). Within the system taught by Koseki ('124) the cache stores a subset of recovery operations stored within a backup log (column 15 lines 32-36).

At the time of invention it would have been obvious to a person of ordinary skill in the art to include within the system disclosed by Kettley ('842) a cache memory for the log. This modification would have been obvious because cached data is accessed faster (Koseki ('124) column 1 lines 48-51).

Demers ('240) teaches a system that performs messaging backup of a shard database (column 2 line 65 through column 3 line 5). This includes add, update and delete

messages (column 10 lines 23 et seq., records of add, update and delete actions would all be needed for rollback and rollforward).

At the time of invention it would have been obvious to a person of ordinary skill in the art to modify the system disclosed by Kettley ('842) such that it operations on a database of messages. This modification would have been obvious because it would allow users to share calendars, meeting notes and other data (Demers ('240) column 1 lines 53-58).

20. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kettley ('842) in view of Demers ('240).

Kettley ('842) discloses a system including data storage for storing a primary copy of a data repository and including secondary data storage (column 6 lines 19-24), wherein data are held in the primary copy of the data repository following a send operation and are retrieved from the primary copy of the message repository for delivery (column 11 lines 17-26, normal database operation involves reading and writing data), and wherein a secondary copy of the data repository is stored in the secondary data storage and log records are written to record send and retrieval events performed within transactional units of work since creation of the secondary copy (column 2 lines 61-65 and column 6 lines 65-67), the system including a recovery component adapted to control the data communication system (column 6 lines 19-24, the queue manager) to perform the following steps:

in response to a failure affecting a primary copy of the data repository, identifying from said secondary copy a set of operations required for restoring said data and reapplying send and retrieval operations to a primary copy of the data repository (column 5 lines 4-12);

determining the state, at the time of the failure, of each unit of work corresponding to one or more operations of the identified set of restore operations (column 7 lines 55-59); and

performing restore operations of said identified set for which said performance is consistent with the determined state of the corresponding unit of work (column 7 lines 39-42), and discarding restore operations of said identified set for which performance is inconsistent with the determined state of the corresponding unit of work (column 9 lines 24-29).

Kettley ('842) does not explicitly disclose the system within a messaging communication system and wherein the recorded entries are messages and wherein the data storage repository events and operations are specific to messages.

Demers ('240) teaches a system that performs messaging backup of a shard database (column 2 line 65 through column 3 line 5). This includes add, update and delete messages (column 10 lines 23 et seq., records of add, update and delete actions would all be needed for rollback and rollforward).

At the time of invention it would have been obvious to a person of ordinary skill in the art to modify the system disclosed by Kettley ('842) such that it operations on a database of messages. This modification would have been obvious because it would allow users to share calendars, meeting notes and other data (Demers ('240) column 1 lines 53-58).

Conclusion

The prior art made of record on accompanying PTO 892 form and not relied upon is considered pertinent to applicant's disclosure. Specifically, Bailey ('252) teaches a system that records backup data and database transactions marked as committed or aborted depending on whether they were successful, Hobson ('051) teaches a system that records progress as a series of units of work and rolls back to the last complete unit for a process after failure, Lupton ('674) teaches a system that copies incomplete units of work to a backup log, and Nishigaki ('871) teaches a system that keeps a backup of a database using update pages of data and a page table with a separate log of changes for organizing recovery actions.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Schell whose telephone number is (571) 272-8186. The examiner can normally be reached on Monday through Friday 9AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Scott Baderman can be reached on (571) 272-3644. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JS



SCOTT BADERMAN
SUPERVISORY PATENT EXAMINER